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INDIAN CORN AND THE INDIAN.

BY E. LEWIS STURTEVANT, M.D.

MAIZE is the product of an ancient American civilization, which if small as compared with that of to-day, yet was capable of achieving results which we of the present gladly appropriate. It constituted the daily food of tribes which have now disappeared from existence, and at the time of the discovery was a cherished plant throughout the temperate and the tropical regions of America, and finds mention in nearly every account of the voyager, or hardy explorer who penetrated beyond the confines of the coast. The plant has never been recorded as being found in a wild state, but has existed in numerous varieties from time immemorial, and the leading races grown to-day can find more or less certain identification in the imperfect descriptions of the species grown by the Indians.

It is a general observation that varieties are produced through the influence of the wants and the choice expressed by civilization, and hence we may conclude that the vast number of varieties of maize that formerly, as now, existed, have been derived through the appreciation of a culture that was under the influence of varied and critical consumers. In Central America the conditions existed for producing varieties, and hence wheresoever the home of the native plant is to be located, from this central region must we preferably look for the origin of the domesticated maize-plant, as we now know it, or at least of some of its races. We have evidence in the tropical nature of the plant that it was originally derived from a country where winters were unknown, or were mild. The few traditions that we have found recorded by the Indians all point towards Central America, as where it is stated in the Popol Vuh that four barbarians, the Fox, the Jackal, the Paraquet and the Crow, guided to Paxil or Cayala, the "land of divided and stagnant waters" where "the white and the yellow maize did abound," and apparently a civilized country, and where the use of maize for meal and for preparing "nine drinks" was acquired. The Navajoes have the tradition that a turkey hen came to them flying from the direction of the morning star, and shook from her feathers an ear of blue corn (Bancroft, Native Races, III, 83). The Indians of Massachusetts, as Roger Williams writes, have a tradition that the crow brought "them at first an Indian graine of corne in one Eare, and an Indian or French Beane in another, from the great God Kautautowits' field in the Southwest, from whence they hold came all their Corne and Beanes" (Key to the Lang. of Am., 1643, p. 144, Narragansett Club ed.).

The antiquity of maize, as well as its importance, is attested by the circumstance of its connection with religion, and its acquirement of sacred characters. Centeotl, in Mexico, was goddess of maize, and hence of agriculture, and was known, according to Clavigero, by the title, among others, of Tonacajohua, "she who sustains us." Sahagrun writes of the seventy-eight chapels of the great temple at Mexico, that the forty-fifth edifice was called Cinteupan, and therein was a statue of the god of maize. Torquemada also says "there was another chapel dedicated to the god Cinteutl, called Cinteupan, he was the god of maize and of bread," and Charnay (1880), who quotes the above references, found a statue bearing sculptural representations of ears of maize.

The Mexican god Tlaloc is represented by Ixtlilxochitl "in the picture of the month Etzalli with a cane of maize in the one hand and in the other a kind of instrument with which he was digging the ground" (Bancroft, Native Races, III, 325), and various ceremonials in relation to maize are recorded by many of the early Spanish writers upon Mexico.

In Peru the maize of Titiaca was considered sacred, and was distributed throughout the kingdom in small parcels to impart a portion of its sanctity to the granary wherein it was stored (Garcilasso, Royal Com. Hak. Soc. ed., I, 288), and in the garden of the Inca: "There was also a large field of maize, the grain they call quinua, pulses, and fruit trees with their fruit; all made of gold and silver" (*ib.*, I, 283). Acosta also describes ceremonies in which maize took part.

It seems certain that the Indians of America were often agricultural, especially under circumstances where the soil was favorable, and where tribal strength admitted of the protection of their crops, and that maize was cultivated not only sufficient for their own wants but also to admit of furnishing supplies to others in need. We think it well to bring together evidence to this effect connected with the northern portion of our country.

In the Icelandic Saga, in 1006, Karlsefne arrived at a place called Hop, at the mouth of a river, which may as well be the St. Lawrence as any other, as this seems to answer the conditions of the narrative, and "they found there upon the land self sown fields of wheat, there where the ground was low, but vines there where it rose somewhat" (Icelandic Sagas, Prince Soc. ed., p. 54), and "sent out two Scotch people to explore; when they returned they brought back a bunch of grapes, and a new sowen ear of wheat" (Voyages of the Northmen, Prince Soc. Pub., p. 51). "The same year (1002) [Rafn.], sailing from Greenland westward, Thorwald, brother of Lief, reached the wintering place in Vinland [mouth of the St. Lawrence]. The following summer * * * * on an island far westward 'met with a wooden Kornhjalmr,' but saw no other signs of inhabitants, nor of wild beasts" (Pickering Chron. Hist. of Pl., p. 664). In 1535, Jacques Cartier, at Hochelega, now Montreal [the island far westward?], "began to find goodly and large fields, full of such corn as the country yieldeth; it is even as the millet of Brazil, as great and somewhat bigger than small peason, wherewith they live even as we do, with ours" (Pinkerton's Coll. of Voy., XII, 651), and elsewhere he says: "At the top of the houses were garners where they kept their corn, which was something like the millet of Brazil, and called by them *Carracony* (Tytler's Disc. of N. Coast of Am., p. 46), and he further states that the town was situated in the midst of extensive corn fields and the houses were large and commodious (Cartier's Voy. Hak. Coll.). Another name for the corn seemed to have been *offici*, and he also adds: "They have also great store of musk-millons, pompions, gourds, cucumbers, peason and beans of every color, yet differing from ours" (Pinkerton's Voy., XII, 656). In 1613 Champlain found at Lake Coulonge, on the Ottawa river, a crop of maize growing (Parkman, Pioneers of France, 348) in this northern latitude, and on the Ottawa river, 1632, mentions also pumpkins, beans and French peas obtained recently from the traders (*ib.*, 352).

This year on Lake Huron, Champlain saw fields of maize, idle pumpkins ripening in the sun, and patches of sunflowers (*ib.*, 366). " The Adirondacs," says Colden, " formerly lived 300 miles above Trois Rivers; * * * * at that time they employed themselves wholly in hunting, and the Five Nations made planting of corn their business (Hist. of the Five Nations, Lond., 1747).

In 1615 Champlain invaded the Iroquois country, the present New York, and saw the Iroquois at work among their pumpkins and maize, gathering their harvest, for it was the month of October. In 1653 Le Moyne navigated Lake Ontario, and in the country of the Senecas had given him " bread made from Indian corn, of a kind to be roasted at the fire." In 1687, in an invasion into this country by de Nouville, some 400,000 minots, or 1,200,000 bushels of corn were said to have been destroyed (Doc. Hist. of N. Y., 1, 238); and in 1696, Frontenac, in the country of the Onondagas, spent the 7th, 8th and 9th of August with his army in destroying the growing corn which extended from a league and a half to two leagues from the fort (*ib.*, 1, 212). In 1779, when the army under Gen. Sullivan came to the vicinity of Cayuga and Seneca lakes, they found the lands cultivated, yielding abundant corn, extensive orchards, and a regularity in the arrangements of their houses which announced prosperity and enjoyment of property; the houses were framed and painted and possessed chimneys (Trans. N. Y. Agr. Soc., 1850, 380), and Gen. Sullivan says of the Indians of the Genessee valley that their fields were fruitful with " every kind of vegetable that could be perceived," and another record catalogues " corn, beans, peas, squashes, potatoes, onions, turnips, cabbages, cucumbers, watermelons, carrots and parsnips (Conover's Early History of Geneva, N. Y., p. 47).

When Verrazzano, 1524, visited the New England coast he found the Indians would trade only at a distance, and when he landed he was welcomed with the war-whoop and clouds of arrows. This is worthy of note as showing that the conditions were unfavorable to agriculture. When Capt. John Smith visited the coast he enumerates " pompions, gourds, strawberries, beans, pease and mayze (The Desc. of New England, 1614, p. 16; Peter

Force Coll. of Tracts, II), and mentions "Mattahunts, two pleasant isles of groves, gardens and corne fields a league in the sea from the mayne" (*ib.*, p. 5), and this indicates a change in the local conditions rather than a change of habits in the people. Champlain, in 1605, describes the method of storing maize in large grass sacks buried under ground in dry places, and mentions the methods of field cultivation at the mouth of the Kennebec and Cape Cod, and finally says that after passing Cape Cod they found much land well tilled in corn and other grains (Champlain's Voy., Prince Soc. ed., p. 121, etc.), and in 1636, when the English made an attack on the Indians of Block island, they found "two hundred acres of land were under cultivation, and the maize, already partly harvested, was piled in heaps to be stored away for winter use (Bryant's Hist. of the U. S., II, 4). When the pilgrims first landed they sent out Miles Standish to explore, and "from thence [Truro] we went on, and found much plain ground, about fifty acres, fit for the plough, and some signs where the Indians formerly planted their corn. * * * * We went on further and found new stubble, of which they had gotten corn this year" (Young's Chron. of the Pilg., 130, 132). This same Nov. 16, 1620, they found "divers fair Indian baskets filled with corn, some whereof was in ears, fair and good, of divers colors" (Morton's New Eng.'s Memorial ed., 1826, p. 40), and Mouart says of this corn, "some yellow, and some red, and others mixt with blue" (Mass. Hist. Soc. Coll., Ser. I, VIII, 210). Higginson (1629) mentions also the color of the corn in New England, as "red, blew and yellow, &c.; and of one corne there springeth four or five hundred" (New England's Plantation, 118, Mass. Hist. Soc. Coll.); and Josselyn, before 1670, describes not only corn of various colors, but beans, pumpkins, squashes, etc. Lescarbot (Hist. Nouv. France, ed. 1612) says the Indians of Maine, like those of Virginia and Florida, plant their corn in hills, along with beans.

At first the Swedish settlements at New Jersey and Pennsylvania (1638) were obliged to buy maize of the Indians for sowing and eating (Peter Kalm, Trav.), and in 1633, on the Delaware river, obtained from the Indians corn and peas (Hazard's Annals of Pa., 32). As showing the importance of corn to the Indians, we may note that Rev. John Campanius, in his Delaware and Swedish translation (1696) of the Catechism, accommodates the

Lord's Prayer to the circumstances of the Indian thus: instead of "give us our daily bread," he has it, "a plentiful supply of venison and corn" (*ib.*, 101). In 1609 Hudson mentions "a great quantity of maize" near where is at present Rensselaer county, N. Y.

In Virginia, Grenville, in 1585, "with hasty cruelty ordered the village to be burned, and the standing corn to be destroyed" (Bancroft, Hist. of the U. S., I, 96); Heriot, and Strachey mention maize, as also John Smith and many others, and the method of Indian culture is described in "A True Declaration of Virginia," 1610.

In the expedition of Narvaez to Florida, in 1528, maize was found in abundance. In 1544 the Indian tribes everywhere on the route of De Soto's expedition from Florida to Alabama, Mississippi, Missouri and westward were found to be an agricultural people, subsisting largely upon maize, and in De Bry's collection, 1591, Plate XXI, Vol. II, represents Florida Indians of both sexes engaged in the cultivation of the fields. Indeed, there is hardly an account of Florida in the sixteenth century but what mentions inferentially or otherwise maize, beans and pumpkins as being produced in great abundance.

In 1540 Coronado started from Mexico for an expedition northward, and everywhere, where the soil was suitable, found maize and other products of cultivation, even to his most northern point, which is probably the now State of Kansas, a country "well watered by brooks and rivers, * * * the soil was the best strong black mold, and bore plums like those of Spain, nuts, grapes and excellent mulberries. The inhabitants were savages, having no culture but of maize." Marquette in 1673, Alouez in 1676 and Membrè in 1679 all mention the cûltivation of maize by the Illinois Indians, and in 1680 Hennepin found corn everywhere in his journey from Niagara to the Mississippi river.

We have now briefly, by the use of a few only of the authorities at our command, shown the existence of the cultivation of maize throughout a large part of the borders of the present United States. A few more references of a later date may serve to impress the fact that the Indians were anciently an agricultural race where the conditions for agriculture were favorable. In Gen. Wayne's letter to the Secretary of War, August, 1794, he speaks of the Delawares of Ohio: "The margin of those beautiful rivers, the Miami's, of the lake and Au Glaize—appear like one continued village for a number of miles, both above and below this place; nor have I ever before beheld such immense fields of corn in any part of America, from Canada to Florida." Preceding this account, Carver, the celebrated English traveler, who traveled upwards of 5000 miles of the interior about the period of the Revolutionary war, writes that the Ottagammies, the Saukees and all the Eastern nations, were found growing Indian corn. In 1804 the Sioux of the Upper Missouri were found by Lewis and Clark cultivating corn, beans and potatoes, and indeed the references to Indian cultivation either directly by the observers, or indirectly through antiquarian evidence, place beyond a doubt the existence of an agriculture often more or less rude, often more or less perfect, among the tribes of Northern Indians with irrigated fields and a systematized agriculture among some of the tribes of the Southwest.

Let us note very briefly a few points to show that the Northern Indians were intelligently desirous of securing agricultural products which would add to their luxury or support. We will not refer to the Southern or Nahua tribes, for their possession of maize, beans, pumpkins, sweet potatoes, yams, cassava, chocolate, peppers, tomatoes, etc., etc., in numerous varieties are sufficient evidence of their progress in agriculture, even if we refrain from mentioning the gardens of Mexico and Peru, which antedate the existence of similar institutions in France, if Hallam is to be credited, and in Mexico "flowers were the delight of the people."

The melon is mentioned in 1494 as grown by the companions of Columbus at Isabella island, and this is their first occurrence in America. In 1535 Jacques Cartier speaks of the Indians at Hochelega, now Montreal, as having "great store of muskmilions." In 1540 Lopez de Gomara mentions *melons* as grown at Quivira, in the country of Tiguex, which appears to be somewhere in the region of the present Arkansas, and in 1850 Antonio de Espejo found *melons* cultivated by the Concho Indians. In 1542 the army of the viceroy, sent from Mexico to Cibola, found the melon already there. Indeed melons are mentioned by the early visitors in New England, Virginia, Florida and the West. This rapid distribution of a desirable fruit is strong evidence in favor of the care the Indians gave to their fields, in securing and preserving seed.[1]

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[1] We must remember, however, that by the older horticulturists the pumpkin was often called a melon.

Peach stones were among the articles ordered by the Governor and Company of the Massachusetts Bay in New England in 1629. In 1683 Wm. Penn speaks of the Indian orchards of peaches about Philadelphia as bearing great abundance of fruit "not inferior to any peach you have in England, except the true Newington." Hilton, in 1664, speaks of peaches abounding in Florida, and Du Pratz, in his history of Louisiana, 1758, says the natives had doubtless got their peach trees from the English colony of Carolina before the French established themselves in Louisiana, and says that they were of the clingstone variety. In the destruction of the Indian settlement at Geneva, N. Y., by Gen. Sullivan in 1779, peaches are enumerated in Major Beatty's account of a near town called Kershong. Among the Indian products destroyed in this invasion, apple, pear and plum trees are also distinctly mentioned, and so remarkable was the town of Kendaia for its orchards, that it was called Apple-town. Wm. Bartram, in his travels in the South about 1773, speaks of the carefully formed orange groves of the Indians, and in one place of a cultivated plantation of shellbark hickory. The settlers of Michigan, in 1805, found here and there about the State orchards of seedling apple trees planted by the Indians, and which, though of great age, were healthy and productive. We thus see that the Indians were willing to exercise a forethought in growing plants which would produce only a long time after being planted.

The cultivation of the potato was first introduced into New England in 1719, and its growing as a field crop is first mentioned at Salem, Mass., in 1762. In 1779, on the authority of Moses Fellows, sergeant of the 3d N. H. regiment, under Gen. Sullivan, the soldiers destroyed, on Sept. 9, at the present Geneva, N. Y., the crops of the Indians, which included "corn, beans, peas, squashes, *potatoes*, onions, turnips, cabbages, cucumbers, watermelons, carrots and parsnips."

Our citations are sufficient to call attention to the agricultural tendencies of the Indian population of North America, and justify in their analyses our first remark, that where the circumstances of climate and soil were favorable, and where the tribal strength was sufficient to protect the crops, the Indians were apparently a people who might properly be termed agricultural.

It is this agricultural feature of the Indian character which tended to develop the many varieties and agricultural species of maize. At the time of the discovery of the various regions of our country in detail, the Indians had already accomplished in the matter of improvement of varieties of maize what we are at present using, and we have no evidence, I speak after careful research, that any new forms of maize have appeared from our two centuries or more of civilized cultivation. The various agricultural species of maize, the flints, dents, softs, sweets and pops appear to be original forms; the subdivisions of these into local forms appear to have been about as well accomplished by the Indians as by ourselves. The leading forms of maize, in all the cases where sufficient material has been collected for examination, can be referred to an Indian original, and a more cursory examination into all the forms, seems to indicate that this Indian origin is common with all.

If we ask the maize plants themselves to tell their own story, we have for reply :

We are originally of a warm region, for our seeds require about 80° F. for their best germination, and our roots occupy only the hotter regions of the soil. We are of very ancient origin, and many ages ago separated into several groups, for we now represent five different families, which do not easily fraternize and which resist attempts at mingling, to a more or less extent, but not reciprocally. We have been long domesticated, for we have lost the power of becoming feral, in our civilization we do not recognize our barbarian ancestry even by sight, we have long ago separated into agricultural species for the convenience of man, we have within each of our species given to man's continuous asking varieties suited for his necessities to accompany him to regions of short seasons, and to regions unknown to our ancestry. We have varied for man as he has required new wants of us, yet we have maintained the traditions of our origin, when man has not compelled us to discard. We yet ask the temperature for our growth that our ancestors enjoyed; we yet ask that we shall not be subjected to shade. Upon unessentials we have yielded, perhaps after long repeated persuasion, to mold our product to man's desire for quantity, to change our habit of bearing, to get along with a greater or less continuance of heat, to grow larger or smaller plants, to protect ourselves from the thieving of birds or insects, to abandon those agencies for our own survival, from which care man has relieved us. We now consider ourselves as respectable and useful among man's companions, and in our habits we would show the generations of culture we have received.

Leaving our plant and returning to human experience, we can summarize our view by saying that the problem of similarity of types with great structural diversity of kernel, is only soluble by influences which have had a very long period of time to work in; and the perfectness of the result attained is to be explained only upon the supposition of a very long period of intelligent selective action. It is very probable that a more intimate acquaintance with the facts concerning the development of a single domesticated plant, as gained from philological, physiological and recorded data will some time or other tend to throw some light upon the antiquity of man and the direction and extent of his migrations.

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ON THE EVOLUTION OF THE VERTEBRATA, PROGRESSIVE AND RETROGRESSIVE.[1]

BY E. D. COPE.

(Continued from page 148, February number.)

III. THE LINE OF THE UROCHORDA.

EMBRYOLOGICAL evidence leads us to anticipate that the primitive Vertebrata possessed nothing representative of the vertebrate skeleton beyond a chorda dorsalis. Above this axis should lie the nervous chord, and below it the nutritive and reproductive systems and their appendages. Such a type we have in its simplest form in the Branchiostoma, the representative of the division of the Acrania. In the animals of this division the mouth and anus have the usual vertebrate position, at opposite ends of the body-cavity. The Tunicata (formerly referred to the Mollusca) are now known to present a still more primitive type of Vertebrata, to which the name of Urochorda has been given. These curious, frequently sessile creatures, have a vertebrate structure during the larval stage, which they ultimately lose. They have the necessary chorda, and nervous axis with a brain, and a cerebral eye. They have at this time a tail, and are free-swimming; a peculiarity which a few of them retain throughout life (Appen-

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[1] A lecture delivered before the Franklin Institute, Jan. 16, 1884. (Erratum: on p. 147, 2d line from bottom, omit "Batrachia.")